No. XVI.

Memorandum concerning a new Vegetable Muscipula. By Dr. Barton.

Read February 18th, 1803.

February, 16th, 1803.

The existence of an irritable principle in vegetables was denied by Haller, by Gaubius, and by Wolf, but has been completely demonstrated by the researches of many of the botanists. This principle is now found to pervade almost every part of the organized plant. It is particularly conspicuous in the stamens and pistils, or male and female organs of generation, in vegetables. With respect to these organs, it would indeed seem, that the irritability which they possess is almost entirely subservient to the function of generation.

In many vegetables, the irritable power is very remarkable, and some facts would lead us to believe, that it is accompanied by the sense of perception. The wonderful faculty of the Dionæa muscipula, one of the native plants of our country, is now pretty well known to every person who is studious of the interesting subject of vegetable physiology. Each leaf of the Dionæa is terminated by a glandular-like apparatus, which immediately closes upon, and retains, the insect that alights upon it. Something of the same kind has been discovered in different species of Drosera, or Sundew.

We are by no means acquainted with the extent of the irritable principle in vegetables. It will, doubtless, be found to pervade the vegetable structure much more generally than is now supposed. In particular, we may expect to discover instances of irritability in many vegetables, in which this attribute has not, hitherto, been observed. In the summer of 1801, I discovered a vegetable muscipula in the vicinity of Philadelphia. Having collected some branches, in flower, of the Asclepias syriaca, or Syrian Swallow-wort, well known in

the United States by the names of Wild-cotton, cotton-plant, &c*; with the view of making some experiments with the milky juice of this plant, I was not a little surprized to find, in the course of a few hours, a number of the common house-flies strongly attached to the flowers; being secured, some by their proboscis, and others by their legs: the greater number, however, by their legs. I, at first, imagined, that the flies were merely retained by the viscous juice of the flowers of this Asclepias: but I soon found, that this was not the case They were detained by the small valves of the flower, and I observed, that the irritability of the valves seemed to reside exclusively in one particular spot, not larger than the point of a common sized pin. Neither in this spot nor in any other part of the valve, could I observe the least vestige of a glutinous or viscous quality. I think it sufficiently evident, that the valve is endued with the irritable principle.

In the genus Asclepias, the valves which I have noticed, are ten in number, being situated in pairs, so as to form five little *foviæ*, the structure and uses of which are not sufficiently known to the botanists.

A considerable number of flies, not less perhaps than sixty or seventy, which alighted upon the flowers of my Asclepias, were detained in the manner I have mentioned, a few by their proboscis, the greater number, however, by their legs; and a very few by their proboscis, and one or more of the legs. Many of the flies, particularly the larger ones, were enabled, after some time, to disengage themselves from their prison, without the loss of any of their limbs or organs, or any perceptible injury whatever. Many others effected their escape, not however, without the loss of one or more of their legs, or their proboscis. Not a few, after making long and repeated efforts to regain their liberty, perished in their vegetable prisons.

* This is a very common plant in every part of the United States, that I have visited; viz. from the latitude of 43 to that of 38. It is a vegetable of considerable importance; and, accordingly, it is cultivated, with much attention, in some parts of Europe. Paper, cloth, and other useful articles are made out of its stems, the silk-like matter in the follicles, &c. In Canada, a good brown sugar is procured from the nectar of the flowers. In the vicinity of Philadelphia, the plant flowers in June and July.

I cannot find, in any of the authors whom I have consulted, any mention of the curious property of the Asclepias syriaca, which I have described: and yet this is a very common vegetable, not only in America, but likewise in the old world. It is evident, however, from a passage in the *Genera Plantarum* of Mr. De Jussieu, that the fly-catching property of some species of Asclepias has been noticed, before me. In describing the *organa sexualia* of this family of plants, the learned French botanist has the following words: "An potiùs circumscripto sexu, non pro polline tantùm, sed pro antheris etiam habenda corpuscula quorum valvulas contrahunt distrahuntve cornua, vectium elasticorum more sæpé muscicapa, non aliis nata laboribus." I may add, that the flowers of the Apocinum androsæmifolium, a North-American vegetable, very nearly allied to the genus Asclepias, have been shown, by Dr. Darwin and other writers, to be endued with the property of catching insects.

It is a curious fact, which may be worth mentioning, in this place, that several of the *Contortæ*, or Contorted plants, to which the genera Asclepias and Apocinum belong, prove destructive to insects, in various ways. I shall not repeat what I have already said, concerning the two genera, just mentioned. It is a well-ascertained fact, that flies, mistaking it would seem (for instinct often errs) the peculiarly fetid flowers of the Stapelia variegata for putrid flesh, deposit their eggs upon the petals of this plant. As this is not a proper nidus for the eggs, the young ones, when hatched, soon perish. The common Rosebay, or Oleander (Nerium Oleander) is another of the Contorted plants. It has long been known, that this is a poisonous plant. But I do not know, that any person than myself has observed, that this fine vegetable proves very destructive to the common house-flies. These insects visit the Oleander, in order to drink the fluid secreted in the tube of its flowers. The liquor soon intoxicates them, and very few of those which have gained admittance into the blossom, ever return from it. So great is the number of flies destroyed, in the course of one season, by a single Oleander, that I have often thought it would be worth our while to pay more attention,

than we yet do, to the cultivation of this vegetable; as, independently on its beauty, it is so well calculated to lessen the numbers of a most common and troublesome insect.

No. XVII.

On the Process of claying Sugar. By Jonathan Williams. Esq.

Read March 4th, 1803.

The art of refining sugar consists of three operations; the first is *clarification*, so well known in Pharmacy, by the addition of a coagulable substance, and a gentle application of heat. The second is *chrystalisation*, that is, evaporating the superabundant water by a strong application of heat; the third is merely washing away the colouring mucus from the chrystalised mass, by a gradual supply, and minute distribution of water. The last operation being alone the subject of this paper, it is needless to enter into a detail of the preceding ones, which are totally distinct from it.

The mould in common use is made in the shape of a cone, and perforated at its apex. It is placed in the fill-house in an inverted position, and filled from the coolers with the sugar partially granulated, but not sufficiently to separate the grains from the mucus; a great proportion being still held in solution by heat. In this state the mould remains all night, and in the morning is hauled up from the fill-house into a room above, where it is placed upon a pot, the apex of the cone entering the mouth of the pot. The sugar is now become cool, and forms a mass of grains and mucus; but care is taken to keep the room warm enough to prevent the too great inspissation of the mucus. The surface of the sugar at the base of the cone is made level, and having shrunk in consequence of the first running of the mucus, there is sufficient space within the mould to hold a quantity of clay, made, by a proper mixture of water, into a semifluid state, resembling